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TITLE: **SPECIFICATION FOR 88/132 kV
CABLES**

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CP_TSSPEC_153

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INTRODUCTION

The effect of a high voltage cable failure is generally severe in terms of customer outage as well as repair cost to City Power. It is therefore important to ensure that HV cables comply with the required specifications and are of acceptable quality. The implication to suppliers is that City Power will only purchase cables that bear the relevant SABS mark, or that have been fully tested in accordance with the requirements of this specification and SANS 60840.

1 SCOPE

This specification covers City Power's requirements for high voltage cables in accordance with SANS 60840.

2 NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 60840/IEC 60840, Power cables with extruded insulation and their accessories for rated

Voltages above 30 kV ($U_m = 36$ kV) up to 150 kV ($U_m = 170$ kV) – Test methods and requirements.

SANS1411-1 Materials of insulated electric cables and flexible cords Part 1: Conductors

SANS 60529/IEC 60529, Degrees of protection provided by enclosures (IP Code).

NRS 077, XLPE-Insulated Cables and Accessories for systems with nominal voltages of 44 kV, 66 kV, 88 kV, and 132 kV

3 DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations in SANS 60840 and NRS 077 shall apply to this specification.

4 REQUIREMENTS

4.1 General

The high-voltage cables shall be 76/132 kV typically operating at a voltage of 88 kV.

4.2 Conductors

The conductors shall be circular or of Milliken construction (sizes from 1000 and above) and shall be either stranded and compacted aluminium or copper with the cross-sectional areas specified in table 1 below:

Table 1: Conductor size and type

Item	Conductor CSA (mm ²)	Conductor type
1	400	Copper
2	800	Copper
3	1000	Aluminium
4	1600	Aluminium
5	2500	Aluminium
6	630	Aluminium

4.3 Construction

All cables shall comply with the requirements of SANS 60840 with the following requirements detailed below. All conductors shall be fully water blocked.

4.3.1 Metallic sheath

The metallic sheath shall be of corrugated seamless aluminium in accordance with SANS 60840 and capable of carrying the minimum fault current of 40kA for 1s as per NRS 077.

5 TESTS

5.1 Routine Test

City Power reserves the right to request to approve prototype testing before any ordering can commence.

The following routine tests shall be carried out on each manufactured length of cable in accordance with SANS 60840:

- Partial discharge test
- Voltage test
- Electrical test on the oversheath of the cable

5.2 Type Test

Type tests shall be carried out on cable systems, of cables and of accessories in accordance with SANS 60840 respectively. Table 2 below gives a summary and references for type tests of cable systems, cables and accessories.

The type test report shall clearly identify the cables and accessories in accordance with SANS 60840.

Table 2: Summarized list of type tests

Item	Test	SANS 60840 Clauses		
		Cable systems	Cables	Accessories
a	Range of type approval	12.1	13.1	14.1
b	Electrical type tests	12.3	13.3	14.3
c	Test voltage values	12.3.1	12.3.1	12.3.1
d	Bending test	12.3.3	12.3.3	-
	Partial discharge test at ambient temperature	12.3.4	12.3.4	12.3.4
e	Tan δ measurement	12.3.5	12.3.5	-
f	Heating cycle voltage test	12.3.6	12.3.6	12.3.6
g	Partial discharge test at high temperature	12.3.4	-	12.3.4
	Partial discharge test at ambient temperature (after final cycle or after lightning impulse voltage test in item i)	12.3.4	12.3.4	12.3.4
h	Lightning impulse voltage test followed by power frequency voltage test	12.3.7	12.3.7	12.3.7
i	Partial discharge test at high temperature (if not carried out after item f above)	12.3.4	-	12.3.4
	Partial discharge test at ambient temperature (if not carried out after item f above)	12.3.4	12.3.4	12.3.4
j	Tests of outer protection of buried joints	Annex H	-	Annex H
k	Examination	12.3.8	12.3.8	12.3.8.1
l	Resistivity of semi-conducting screens	12.3.9	12.3.9	-
m	Non-electrical type tests on cable components and on completed cable	12.4	12.4	-

5.3 Site Acceptance Test (SAT)

The following on-site tests after installation shall be carried out as per SANS 60840

- a) Voltage withstand test
- b) Partial discharge (PD) measurements on site
- c) Tan δ measurement

6 MARKING, LABELING AND PACKAGING

- 6.1 The cable marking shall comply with the requirements in SANS 60840.
- 6.2 The cable shall be marked with a unique identification marking system. The purpose is to provide asset management information of the cable's manufacture's details, specific drum number traceability and length. This shall be provided using a uniquely marked tape. The tape shall withstand production stresses and the cable operating temperature. The tape shall be placed in the conductor.
- 6.3 In addition, each conductor shall be marked with a unique traceable identification system. Details of the proposed Conductor identification system shall be included in the tendered offer.
- 6.4 The manufacturer shall keep a secure database of all uniquely marked cables supplied to City Power.
- 6.5 It shall be possible to prove ownership of the cable using either the asset management or conductor identification numbers at any given time.

7 DOCUMENTATION

Documentation complying with the requirements of SANS 60840 shall be submitted.

8 QUALITY ASSURANCE

A quality management system shall be set up in order to assure the quality during manufacture, installation, removal, transportation and disposal of the 88/132 kV cables. Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to agreement between the purchaser and supplier.

9 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during manufacture, installation, removal, transportation and disposal of 88/132 kV cables. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

10 HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during manufacture, installation, removal, transportation and disposal of 88/132 kV cables. Guidance on the requirements of a health and safety plan shall be found in ISO 45001:2018 standards. The details shall be subject to agreement between City Power and the Supplier.

ANNEXURE A - BIBLIOGRAPHY

None

ANNEXURE B - REVISION INFORMATION

DATE	REV. NO.	NOTES
September 2006	0	First issue
August 2011	1	Second issue Added the environmental Included the cable marking system Deleted everything related to HV cables related accessories Modified the heading
September 2014	2	Added 2500mm ² and 1600mm ² aluminium cables
September 2018	3	Added new study committee Added on the Normative: SANS 60840/IEC 60840, Power cables with extruded insulation and their accessories for rated voltages above 30 kV (Um = 36 kV) up to 150 kV (Um = 170 kV) – Test methods and requirements; IEC 60228:1978, Conductors of insulated cables; SANS 60529/IEC 60529, Degrees of protection provided by enclosures (IP Code) Added list of test that shall be conducted Added 10 Health and Safety
October 2021	4	Alignment of Annexure D with the SAP Master Added Schedule A & B for each Items

ANNEXURE C - TECHNICAL SCHEDULES A & B
ITEM 1: CAB 132 XLPE 1C 400 CU CSA (SAP No. 1802)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
1		Manufactures name	Required	
2		Country of origin	Required	
3	4.1 a)	altitude	m not exceeding 1800	
4	b)	ambient air temperature	°C -5 °C to 40 °C (average of 25 °C)	
5	c)	soil temperature	°C 0 °C to 30 °C (average of 20)	
6	d)	Minimum soil thermal resistivity	K.m/W 1,2	
7	e)	depth of burial	m 1,2	
8	f)	configuration	laid in close trefoil or flat (2D spacing)	
9	g)	lightning ground flash density	severe (14 flashes/km ² /year)	
10	h)	solar radiation	W/m ² 1 000 to 1250	
11	i)	ultraviolet radiation	high	
12	j)	relative humidity	10 % to 95 %	
13	k)	wind pressure	not exceeding 700 Pa (equivalent to 34 m/s)	
14	l)	pollution severity defined by IEC 60815:	Very heavy	
15	n)	maximum conductor operating temperature	°C 90	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

TECHNICAL SCHEDULES A & B (CONTINUED)

ITEM 1: CAB 132 XLPE 1C 400 CU CSA (SAP No. 1802)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
36	7.1.1	Additional information required:		
37		a) rated voltage	kV	Required
38		b) nominal diameter over conductor	mm	Required
39		c) nominal thickness of conductor screen	mm	Required
40		d) nominal thickness of core screen	mm	Required
41		e) nominal overall diameter of cable	mm	Required
42		f) mass of cable	kg/m	Required
43		g) d.c. resistance of conductor at 20 °C	Ω/km	Required
44		h) a.c. resistance of conductor at 90 °C	Ω/km	Required
45		j) a.c. resistance of sheath with conductor at 90 °C	Ω/km	Required
46		k) reactance per phase	Ω/km	Required
47		l) capacitance per phase	nF/km	Required
48		m) zero sequence impedance	Ω/km	Required
49		n) zero sequence capacitance	nF/km	Required
50		o) rated continuous current	A	Required
51		p) rated symmetrical fault withstand current	kA – s	Required
52		q) rated earth fault withstand current	kA – s	Required
53		r) conductor temperature at specified load)	°C	Required
54		s) conductor temperature after symmetrical fault (1 s) assuming operation at specified load prior to fault	°C	Required
55		t) sheath temperature after earth fault (1 s) assuming operation at specified load prior to fault	°C	Required
56		u) conductor losses at maximum conductor operating temperature	kW/km	Required

Note: 1.Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA [“To Be advised”] will not be accepted

Tender Number: _____

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TECHNICAL SCHEDULES A & B (CONTINUED)
ITEM 1: CAB 132 XLPE 1C 400 CU CSA (SAP No. 1802)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
57		v) type test reports for the cables offered or similar cables previously tested	Required	
58		w) dimensioned drawing of the cable cross-section	Required	
59		x) minimum installation bending radius	m Required	
60		y) cyclic current rating in accordance with IEC 60853-2	A Required	
61		Load profile	Required	
62		z) emergency current rating (IEC 60853-2)	A Required	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be advised"] will not be accepted

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DEVIATION SCHEDULE

ITEM 1: CAB 132 XLPE 1C 400 CU CSA (SAP No. 1802)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of NRS 077	Proposed deviation

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA [“To Be Advised”] will not be accepted

Tender Number: _____

Tenderer’s Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEXURE C - TECHNICAL SCHEDULES A & B
ITEM 2: CAB 132 XLPE 1C 800 CU CSA (SAP No. 1801)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
1		Manufactures name	Required	
2		Country of origin	Required	
3	4.1 a)	altitude	m not exceeding 1800	
4	b)	ambient air temperature	°C -5 °C to 40 °C (average of 25 °C)	
5	c)	soil temperature	°C 0 °C to 30 °C (average of 20)	
6	d)	soil thermal resistivity	K.m/W 1,2	
7	e)	depth of burial	m 1,2	
8	f)	configuration	laid in close trefoil or flat (2D spacing)	
9	g)	lightning ground flash density	severe (14 flashes/km ² /year)	
10	h)	solar radiation	W/m ² 1 000 to 1250	
11	i)	ultraviolet radiation	high	
12	j)	relative humidity	10 % to 95 %	
13	k)	wind pressure	not exceeding 700 Pa (equivalent to 34 m/s)	
14	l)	pollution severity defined by IEC 60815:	Very heavy	
15	n)	maximum conductor operating temperature	°C 90	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

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Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

TECHNICAL SCHEDULES A & B (CONTINUED)

ITEM 2: CAB 132 XLPE 1C 800 CU CSA (SAP No. 1801)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
37	7.1.1	Additional information required:		
38		a) rated voltage	kV Required	
39		b) nominal diameter over conductor	mm Required	
40		c) nominal thickness of conductor screen	mm Required	
41		d) nominal thickness of core screen	mm Required	
42		e) nominal overall diameter of cable	mm Required	
43		f) mass of cable	kg/m Required	
44		g) d.c. resistance of conductor at 20 °C	Ω/km Required	
45		h) a.c. resistance of conductor at 90 °C	Ω/km Required	
46		j) a.c. resistance of sheath with conductor at 90 °C	Ω/km Required	
47		k) reactance per phase	Ω/km Required	
48		l) capacitance per phase	nF/km Required	
49		m) zero sequence impedance	Ω/km Required	
50		n) zero sequence capacitance	nF/km Required	
51		o) rated continuous current	A Required	
52		p) rated symmetrical fault withstand current	kA – s Required	
53		q) rated earth fault withstand current	kA – s Required	
54		r) conductor temperature at specified load)	°C Required	
55		s) conductor temperature after symmetrical fault (1 s) assuming operation at specified load prior to fault	°C Required	
56		t) sheath temperature after earth fault (1 s) assuming operation at specified load prior to fault	°C Required	
57		u) conductor losses at maximum conductor operating temperature	kW/km Required	

Note: 1.Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA [“To Be Advised”] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
 Name in block letters Signature

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TECHNICAL SCHEDULES A & B (CONTINUED)

ITEM 2: CAB 132 XLPE 1C 800 CU CSA (SAP No. 1801)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
58		v) type test reports for the cables offered or similar cables previously tested	Required	
59		w) dimensioned drawing of the cable cross-section	Required	
60		x) minimum installation bending radius	m Required	
61		y) cyclic current rating in accordance with IEC 60853-2	A Required	
62		Load profile	Required	
63		z) emergency current rating (IEC 60853-2)	A Required	

Note: 1.Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

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DEVIATION SCHEDULE

ITEM 2: CAB 132 XLPE 1C 800 CU CSA (SAP No. 1801)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of NRS 077	Proposed deviation

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

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Full name of company: _____

ANNEXURE C - TECHNICAL SCHEDULES A & B
ITEM 3: CAB 132 XLPE 1000 1C AL CSA (SAP No. 1162)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
1		Manufactures name	Required	
2		Country of origin	Required	
3	4.1 a)	altitude	m not exceeding 1800	
4	b)	ambient air temperature	°C -5 °C to 40 °C (average of 25 °C)	
5	c)	soil temperature	°C 0 °C to 30 °C (average of 20)	
6	d)	soil thermal resistivity	K.m/W 1,2	
7	e)	depth of burial	m 1,2	
8	f)	configuration	laid in close trefoil or flat (2D spacing)	
9	g)	lightning ground flash density	severe (14 flashes/km ² /year)	
10	h)	solar radiation	W/m ² 1 000 to 1250	
11	i)	ultraviolet radiation	high	
12	j)	relative humidity	10 % to 95 %	
13	k)	wind pressure	not exceeding 700 Pa (equivalent to 34 m/s)	
14	l)	pollution severity defined by IEC 60815:	Very heavy	
15	n)	maximum conductor operating temperature	°C 90	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

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Full name of company: _____

TECHNICAL SCHEDULES A & B (CONTINUED)
ITEM 3: CAB 132 XLPE 1000 1C AL CSA (SAP No. 1162)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
58		v) type test reports for the cables offered or similar cables previously tested	Required	
59		w) dimensioned drawing of the cable cross-section	Required	
60		x) minimum installation bending radius	m Required	
61		y) cyclic current rating in accordance with IEC 60853-2	A Required	
62		Load profile	Required	
63		z) emergency current rating (IEC 60853-2)	A Required	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

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Name in block letters
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Full name of company: _____

DEVIATION SCHEDULE

ITEM 3: CAB 132 XLPE 1000 1C AL CSA (SAP No. 1162)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of NRS 077	Proposed deviation

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
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Full name of company: _____

ANNEXURE C - TECHNICAL SCHEDULES A & B

ITEM 4: CAB 132 XLPE 1600 1C AL CSA (SAP No. 3330)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
1		Manufactures name	Required	
2		Country of origin	Required	
3	4.1 a)	altitude	m not exceeding 1800	
4	b)	ambient air temperature	°C -5 °C to 40 °C (average of 25 °C)	
5	c)	soil temperature	°C 0 °C to 30 °C (average of 20)	
6	d)	soil thermal resistivity	K.m/W 1,2	
7	e)	depth of burial	m 1,2	
8	f)	configuration	laid in close trefoil or flat (2D spacing)	
9	g)	lightning ground flash density	severe (14 flashes/km ² /year)	
10	h)	solar radiation	W/m ² 1 000 to 1250	
11	i)	ultraviolet radiation	high	
12	j)	relative humidity	10 % to 95 %	
13	k)	wind pressure	not exceeding 700 Pa (equivalent to 34 m/s)	
14	l)	pollution severity defined by IEC 60815:	Very heavy	
15	n)	maximum conductor operating temperature	°C 90	

Note: 1.Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

TECHNICAL SCHEDULES A & B (CONTINUED)
ITEM 4: CAB 132 XLPE 1600 1C AL CSA (SAP No. 3330)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
58		v) type test reports for the cables offered or similar cables previously tested	Required	
59		w) dimensioned drawing of the cable cross-section	Required	
60		x) minimum installation bending radius	m Required	
61		y) cyclic current rating in accordance with IEC 60853-2	A Required	
62		Load profile	Required	
63		z) emergency current rating (IEC 60853-2)	A Required	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters
Signature

Full name of company: _____

DEVIATION SCHEDULE

ITEM 4: CAB 132 XLPE 1600 1C AL CSA (SAP No. 3330)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of NRS 077	Proposed deviation

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEXURE C - TECHNICAL SCHEDULES A & B

ITEM 5: CAB 132 XLPE 2500 1C AL CSA (SAP No. 3331)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
1		Manufactures name	Required	
2		Country of origin	Required	
3	4.1 a)	altitude	m not exceeding 1800	
4	b)	ambient air temperature	°C -5 °C to 40 °C (average of 25 °C)	
5	c)	soil temperature	°C 0 °C to 30 °C (average of 20)	
6	d)	soil thermal resistivity	K.m/W 1,2	
7	e)	depth of burial	m 1,2	
8	f)	configuration	laid in close trefoil or flat (2D spacing)	
9	g)	lightning ground flash density	severe (14 flashes/km ² /year)	
10	h)	solar radiation	W/m ² 1 000 to 1250	
11	i)	ultraviolet radiation	high	
12	j)	relative humidity	10 % to 95 %	
13	k)	wind pressure	not exceeding 700 Pa (equivalent to 34 m/s)	
14	l)	pollution severity defined by IEC 60815:	Very heavy	
15	n)	maximum conductor operating temperature	°C 90	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

TECHNICAL SCHEDULES A & B (CONTINUED)
ITEM 5: CAB 132 XLPE 2500 1C AL CSA (SAP No. 3331)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
58		v) type test reports for the cables offered or similar cables previously tested	Required	
59		w) dimensioned drawing of the cable cross-section	Required	
60		x) minimum installation bending radius	m Required	
61		y) cyclic current rating in accordance with IEC 60853-2	A Required	
62		Load profile	Required	
63		z) emergency current rating (IEC 60853-2)	A Required	

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters
Signature

Full name of company: _____

DEVIATION SCHEDULE

ITEM 5: CAB 132 XLPE 2500 1C AL CSA (SAP No. 3331)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of NRS 077	Proposed deviation

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEXURE C - TECHNICAL SCHEDULES A & B

ITEM 6: CAB 132 XLPE 630 1C AL CSA (SAP No. 4574)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
1		Manufactures name	Required	
2		Country of origin	Required	
3	4.1 a)	altitude	m not exceeding 1800	
4	b)	ambient air temperature	°C -5 °C to 40 °C (average of 25 °C)	
5	c)	soil temperature	°C 0 °C to 30 °C (average of 20)	
6	d)	soil thermal resistivity	K.m/W 1,2	
7	e)	depth of burial	m 1,2	
8	f)	configuration	laid in close trefoil or flat (2D spacing)	
9	g)	lightning ground flash density	severe (14 flashes/km ² /Year)	
10	h)	solar radiation	W/m ² 1 000 to 1250	
11	i)	ultraviolet radiation	High	
12	j)	relative humidity	10 % to 95 %	
13	k)	wind pressure	not exceeding 700 Pa (equivalent to 34 m/s)	
14	l)	pollution severity defined by IEC 60815:	Very heavy	
15	n)	maximum conductor operating temperature	°C 90	

Note: 1.Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

TECHNICAL SCHEDULES A & B (CONTINUED)

ITEM 6: CAB 132 XLPE 630 1C AL CSA (SAP No. 4574)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description		Schedule A	Schedule B
16	4.2.2	Cable operating voltage	kV	132	
17	4.3.1.2	Conductor cross-sectional area	mm ²	630	
18	4.3.1.3	Minimum Symmetrical fault level	kA	40	
19	4.3.1.3	Minimum Fault level duration	sec	1s	
20	4.3.1.4	Type of conductor required		Aluminium	
21	4.3.1.4	Type of conductor offered		Aluminium	
22	4.3.3.2	Nominal thickness of insulation	mm	Required	
23	4.3.3.2	Maximum allowable conductor screen radial stress at U ₀	kV/mm	8,0	
24	4.3.3.2	Maximum allowable core screen radial stress at U ₀	kV/mm	4,0	
25	4.3.6.1	Metallic sheath: seamless corrugated aluminium or copper wire screen		Required	
26	4.3.7.2	Details of water barriers		Required	
27	4.3.6.1.2 or 4.3.6.2.2	Earth fault level (minimum 40 kA)	kA	Required	
28		Fault level duration (minimum 1s)	sec	Required	
29	4.3.6.2.3	Nominal thickness of aluminium sheath	mm	Required	
30	4.3.8.5	Conductive coating applied	Yes/No	Required	
31	6.2.1	Length of cable required per drum	m	Required	
32	6.2.1	Number of drums required	m	Required	
33	6.2.3	Details of cable to be stored		Required	
34	6.2.3	Method of wood treatment (if applicable)		Required	
35	6.2.5	Details of pulling eye offered		Required	
36	6.2.5	Maximum permissible pulling tension	kN	Required	

Note: 1.Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

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TECHNICAL SCHEDULES A & B (CONTINUED)

ITEM 6: CAB 132 XLPE 630 1C AL CSA (SAP No. 4574)

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub-clause of NRS 077	Description	Schedule A	Schedule B
58		v) type test reports for the cables offered or similar cables previously tested	Required	
59		w) dimensioned drawing of the cable cross-section	Required	
60		x) minimum installation bending radius	m Required	
61		y) cyclic current rating in accordance with IEC 60853-2	A Required	
62		Load profile	Required	
63		z) emergency current rating (IEC 60853-2)	A Required	

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Name in block letters
Signature

Full name of company: _____

DEVIATION SCHEDULE

ITEM 6: CAB 132 XLPE 630 1C AL CSA (SAP No. 4574)

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of NRS 077	Proposed deviation

Note: 1. Ticks, Cross [√, X], Asterisk [*], Word [Noted] or TBA ["To Be Advised"] will not be accepted

Tender Number: _____

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ANNEXURE D - STOCK ITEMS**Material Group: CABLE HV**

Item	SAP No.	SAP Short Description	SAP Long Description
1	1802	CAB 132 XLPE 1C 400 CU CSA	132 KV, 400 MM SQ COPPER CONDUCTOR, SINGLE CORE, XLPE INSULATED, SCREENED, CORRUGATED SEAMLESS ALUMINIUM, WITH BLACK PE OUTER SHEATH. ITEM SPECIFICATION NO. CP_TSSPEC_153.
2	1801	CAB 132 XLPE 1C 800 CU CSA	CABLE 132 KV, 800 MM SQ COPPER CONDUCTOR, SINGLE CORE, XLPE INSULATED, SCREENED, CORRUGATED SEAMLESS ALUMINIUM, WITH BLACK PE OUTER SHEATH. ITEM SPECIFICATION NO. CP_TSSPEC_153.
3	1162	CAB 132 XLPE 1C 1000 AL CSA	CABLE 132 KV, 1000 MM SQ ALUMINIUM CONDUCTOR, SINGLE CORE, XLPE INSULATED, SCREENED, CORRUGATED SEAMLESS ALUMINIUM, WITH BLACK PE OUTER SHEATH. ITEM SPECIFICATION NO. CP_TSSPEC_153.
4	3330	CAB 132 XLPE 1C 1600 AL CSA	CABLE 132 KV, 1600 MM SQ ALUMINIUM CONDUCTOR, SINGLE CORE, XLPE INSULATED, SCREENED, CORRUGATED SEAMLESS ALUMINIUM, WITH BLACK PE OUTER SHEATH. ITEM SPECIFICATION NO. CP_TSSPEC_153.
5	3331	CAB 132 XLPE 1C 2500 AL CSA	CABLE 132 KV, 2500 MM SQ ALUMINIUM CONDUCTOR, SINGLE CORE, XLPE INSULATED, SCREENED, CORRUGATED SEAMLESS ALUMINIUM, WITH BLACK PE OUTER SHEATH. ITEM SPECIFICATION NO. CP_TSSPEC_153.
6	4574	CAB 132 XLPE 630 1C AL CSA	CABLE 132 KV, 630 MM SQ ALUMINIUM CONDUCTOR, SINGLE CORE, XLPE INSULATED, SCREENED, CORRUGATED SEAMLESS ALUMINIUM, WITH BLACK PE OUTER SHEATH. ITEM SPECIFICATION NO. CP_TSSPEC_153.